Application of Single-Walled Carbon Nanotubes/Au Nanosol Modified Electrode for the Electrochemical Determination of Esculetin in Cortex Fraxini

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A novel simple, sensitive and selective electrochemical sensor was successfully prepared for the determination of esculetin in Cortex Fraxini based on the carboxylic acid-functionalized single-walled carbon nanotubes-Nafion–Au nanosol nanocomposite modified glassy carbon electrode (c-SWCNTs-NF–AuNs/GCE). Scanning electron microscopy, energy dispersive X-ray spectroscopy, electrochemical impedance spectroscopy and cyclic voltammetry were carried out to characterize the properties of c-SWCNTs-NF–AuNs nanocomposite. Owing to the synergistic effects of large surface area, superior electrical conductivity, and large amount of chemically active sites of c-SWCNTs, together with the good biocompatibility and high conductivity of AuNs, the c-SWCNTs-NF–AuNs/GCE exhibited a good electrocatalytic activity to esculetin with wide linear range of 0.004–55 \textmu M and low detection limit of 0.12 nM. Additionally, the modified electrode was employed for analysis of esculetin in Cortex Fraxini with satisfactory results.

\textbf{Keywords:} Electrochemical determination; Differential pulse voltammetry; Single-walled carbon nanotube; Au nanosol; Esculetin;

\textbf{FULL TEXT}

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